

FACT SHEET FOR NPDES PERMIT WA-002339-6
OLYMPUS TERRACE SEWER DISTRICT

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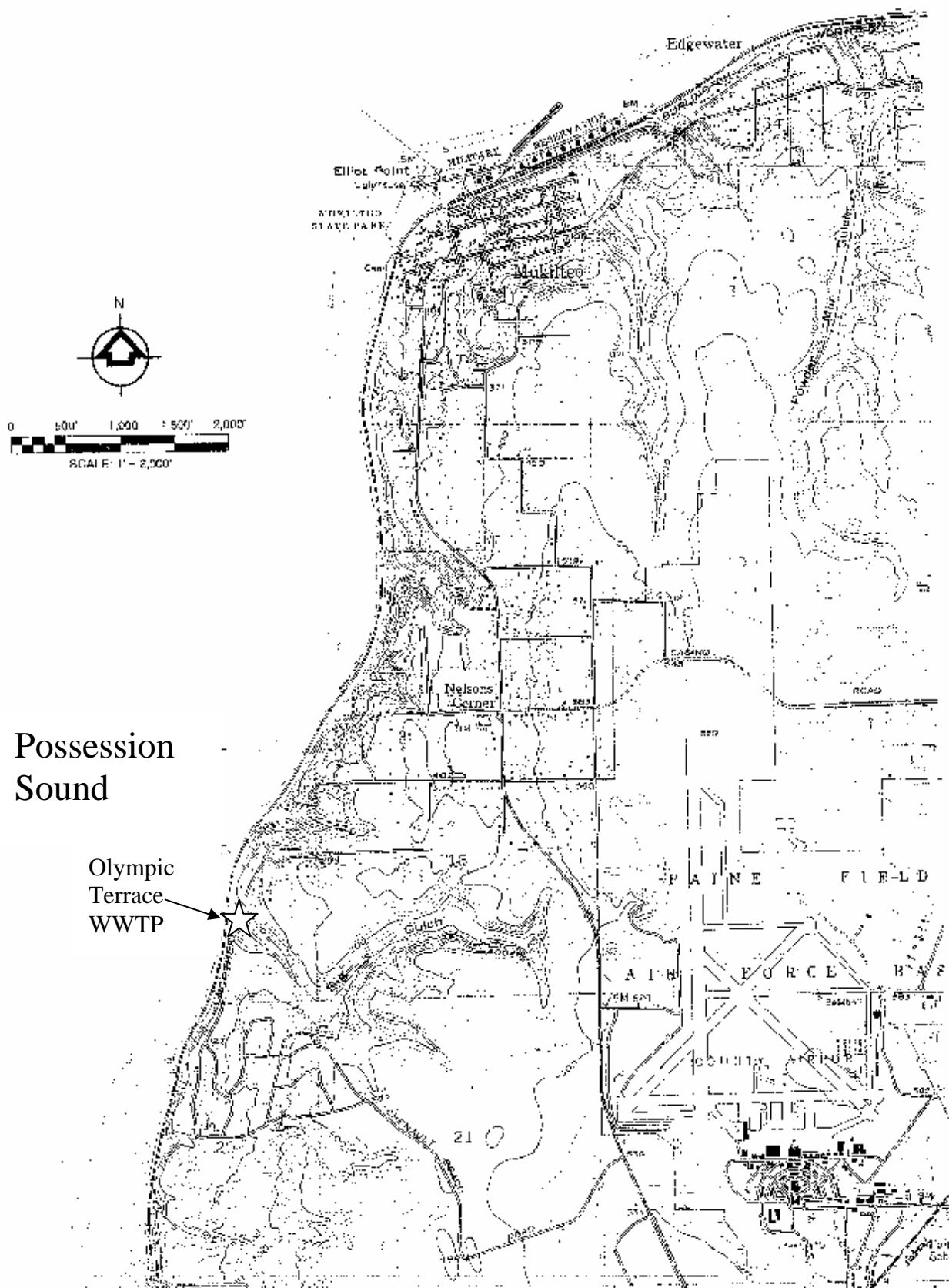
INTRODUCTION

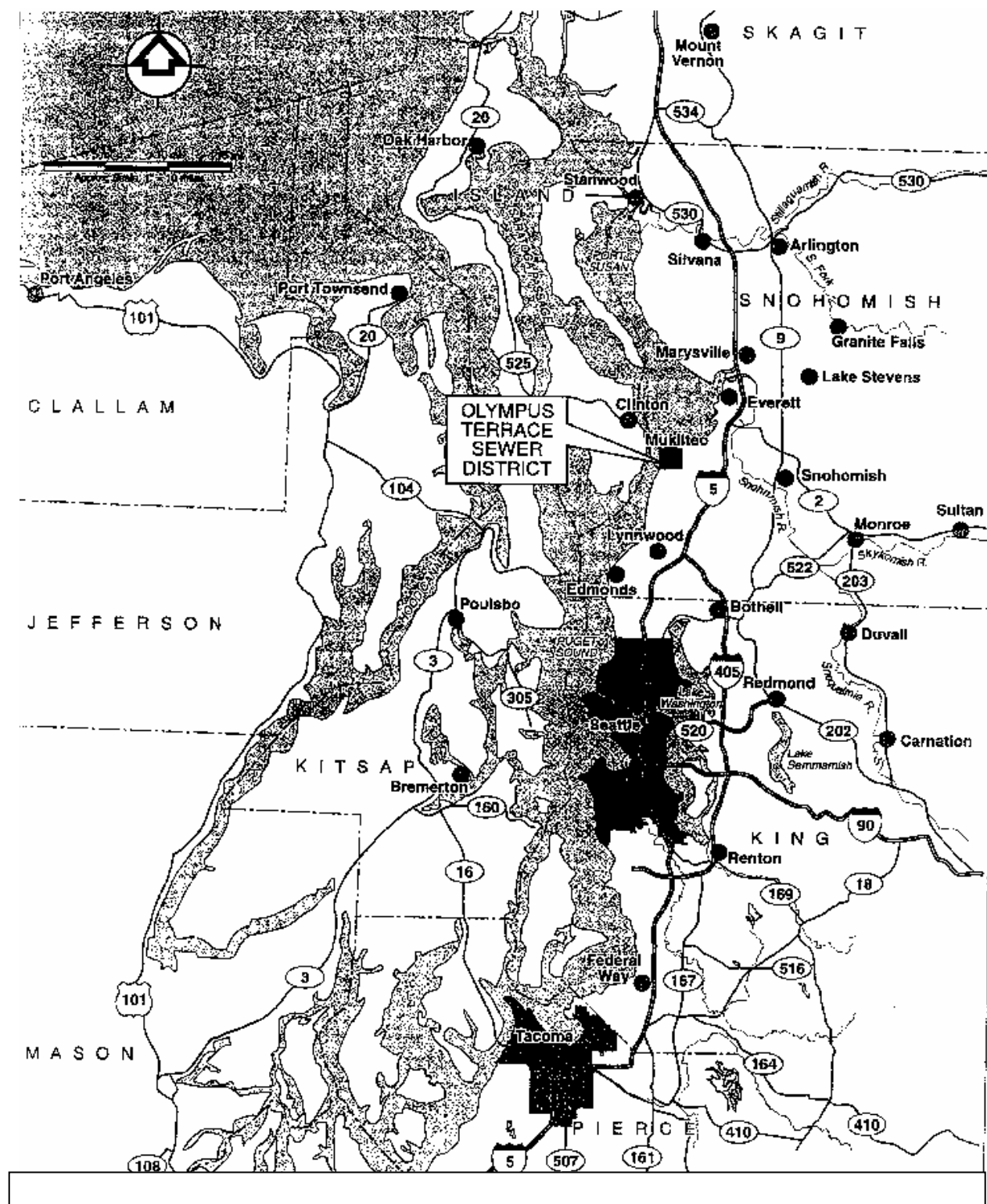
The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Olympus Terrace Sewer District
Facility Name and Address	Olympus Terrace Sewer District Wastewater Treatment Plant 9817 62 nd Place West Mukilteo, Washington 98275
Type of Treatment	Extended Aeration Activated Sludge(Oxidation Ditch)
Discharge Location	Possession Sound Puget Sound Latitude: 47° 54' 47" N Longitude: 122° 19' 24" W
Water Body ID Number	WA-PS-0240





BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The Olympus Terrace Sewer District operates an oxidation-ditch secondary wastewater treatment facility discharging treated effluent to Puget Sound. The plant is located at 9417 62nd Place West within the city limits of Mukilteo, in a 300-foot deep ravine at the mouth of Big Gulch Creek. This location places the plant at the western edge of the District's service area.

The treatment facilities currently include coarse screening, grit removal, influent pumping, a mixing box reactor, two oxidation ditches intermediate bar screens, three secondary clarifiers, a partial flume primary flow measuring device, and UV disinfection unit. The solids handling system includes aerobic digesters and 2-meter-wide belt filter press. Dewatered biosolids are disposed of by contract with Fire Mountain Farms in Cinnear, Washington

HISTORY

The treatment plant has undergone a series of upgrades over its life. The original plant included a coarse bar screen, one 639,800-gallon oxidation ditch aeration basin with rotor aerators, a single 58-foot diameter secondary clarifier with scraper-type Passant mechanism, two 36-inch diameter screw pumps for return pump sludge pumping, chlorine injection equipment with no chlorine contact tanks, and no provisions for sludge waste. The facility was upgraded in 1984 with the addition of a 54-foot diameter clarifier.

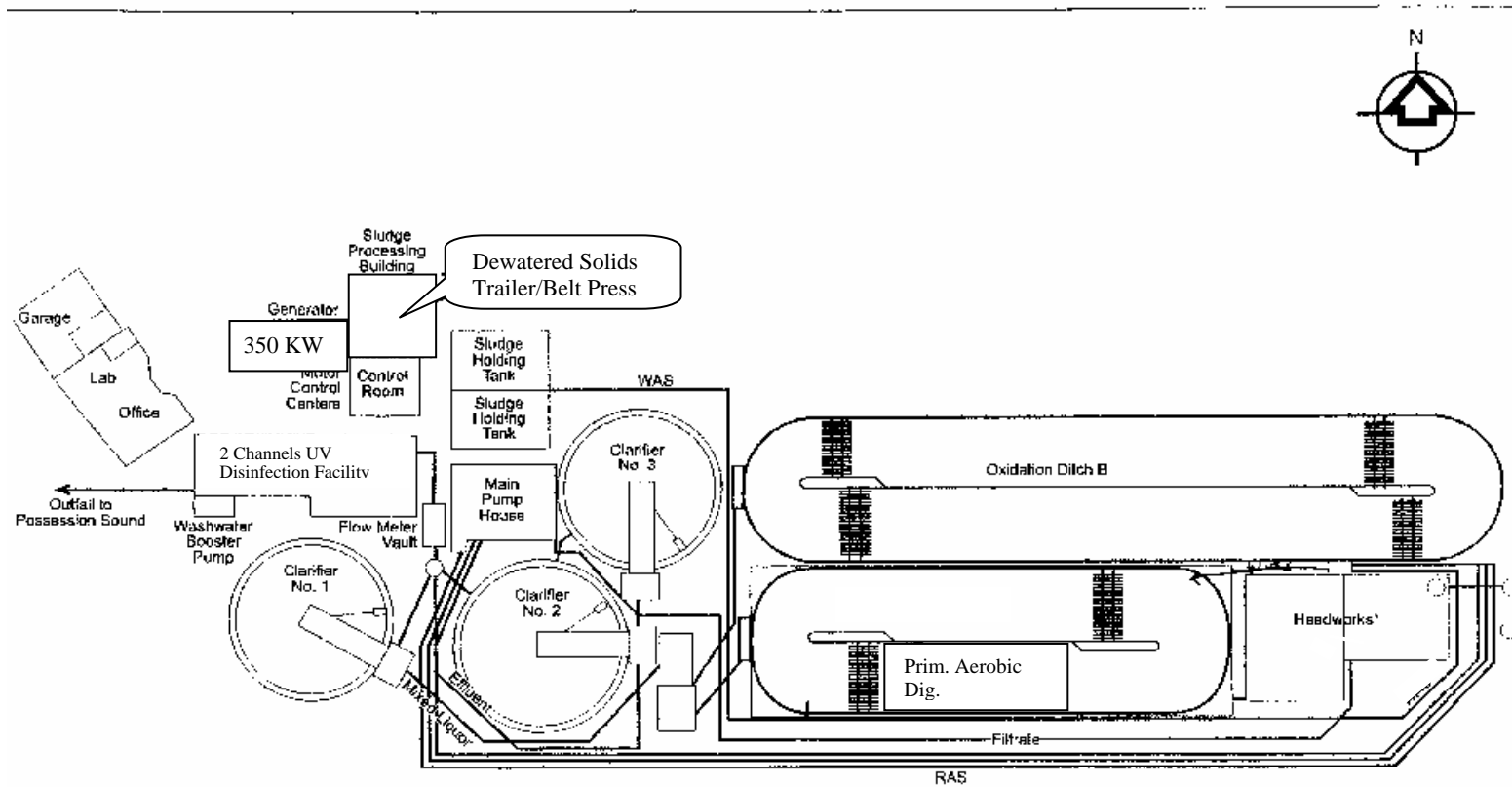
A major upgrade was done in 1989, which included a new head works with manual bar screen; a grit removal channel; influent screw pumps and mixing box reactors; a new 1.07 million gallon oxidation ditch aeration basin; another 54-foot clarifier; new aerobic digesters with rotating fine screen and a rotary drum sludge thickener; new activated sludge, scum and waste activated pumps; new sludge dewatering machines with filtrate return pumps; and new chlorine contact chamber. In 2002, the facility converted from chlorine disinfection to UV disinfection.

COLLECTION SYSTEM STATUS

The collection and transmission system for the District includes 55 miles of gravity sewers and force mains, nine pump stations, and a secondary treatment plant employing the oxidation process.

TREATMENT PROCESSES

The treatment facilities currently include coarse screening, grit removal, influent pumping, a mixing box reactor, two oxidation ditches intermediate bar screens, three secondary clarifiers, a partial flume primary flow measuring device, and UV disinfection unit. The solids handling system includes aerobic digesters and 2-meter-wide belt filter press. Dewatered biosolids are disposed of by contract with Fire Mountain Farms in Cinnear, Washington.



* Headworks includes influent pumps, influent bar screen, grit removal channel, and mixing box reactor

DISCHARGE OUTFALL

Secondary treated and disinfected effluent is discharged from the facility via the 24-inch outfall into Possession Sound, Puget Sound. The land portion of the outfall is constructed of asbestos-impregnated concrete pipe and the submerged portion of the outfall is corrugated steel pipe. The outfall extends 650 feet offshore and terminates in a single 24-inch port on the sea bed at an approximate depth of 50 feet below mean lower low water (MLLW).

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste contractor. Solids removed from the secondary clarifier are treated in an aerobic digester, dewatered and land applied under a permit from the Snohomish County Health District.

PERMIT STATUS

The previous permit for this facility was issued on October 9, 1998. The previous permit placed effluent limitations on Carbonaceous 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria and Total Residual Chlorine.

An application for permit renewal was submitted to the Department on December 10, 2002, and accepted by the Department on February 5, 2003. The permit was subsequently extended by the Department.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility received its last Class II inspection on February 3, 2004. A compliance inspection with sampling was conducted on the same day.

Based on discharge monitoring reports (DMRs) submitted to the Department and inspections conducted by the Department during the last five years, the Permittee has complied with the permit conditions except for the effluent violations outlined below.

Olympus Terrace Sewer District's previous permit was issued on October 9, 1998. Over the last five years, the District exceeded several parameters of its effluent limits. The parameters exceeded are flow, in conduit or through the treatment plant; total residual chlorine; and total suspended solids. The violation occurred between February 1999 and August 2003. Effluent flow has been exceeded 6 times during the life of the last permit. Chlorine total residual limits were exceeded 30 times, and total suspended solids were violated once.

During the permit cycle, the District converted their disinfection system from chlorine to UV (Ultraviolet) disinfection. This has resulted in the removal of chlorine as one of the effluent limits in the NPDES permit.

On October 9, 2000, the District was issued a compliance order No. 98WQ-N147 which required the following:

1. Conduct an engineering evaluation of the wastewater treatment facility. The facility evaluation shall determine what actions are necessary to bring the facility into compliance with effluent permit limits for chlorine.
2. No later than October 1, the District shall complete construction of dechlorination facilities or an alternative disinfection process capable of achieving final effluent limits specified in Special Condition S1.A of NPDES permit.
3. The interim wastewater discharge limits of 0.5 mg/L Monthly Average and 1.2 mg/L Daily Maximum for Chlorine will be enforced until October 1, 2000.

On April 1, 1999, the Olympus Terrace Sewer District requested the re-rating of the treatment plant's maximum month flow capacity from 2.28 million gallons per day to 2.61 mgd. In a December 18, 2000, letter to Ecology, the District agreed to withhold its re-rating request until after the completion of the UV disinfection system. On May 14, 2003, the District requested that the compliance be rescinded with a formal notice acknowledging that the District has met the requirements of this order. On February 6, 2004, the Department of Ecology determined that Olympus Terrace Sewer District has satisfied the conditions imposed in accordance with Chapter 90.48 RCW.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization

<u>Parameter</u>	<u>Concentration</u>
CBOD ₅	4.3 mg/L
TSS	6.8 mg/L
Ammonia	0.505 mg/L N
Total Kjeldahl Nitrogen (TKN)	1.74 mg/L N
Nitrate	14.2 mg/L
Phosphorus (Total)	3.66 mg/L
Total Dissolved Solids (TDS)	297 mg/L
Chromium	0.0017 mg/L
Total Phenolic Compounds	0.0289 mg/L
Copper	0.0067 mg/L
Nickel	0.0029 mg/L
Zinc	0.1144 mg/L
Hardness (as Ca CO ₃)	37.8 mg/L CaCO ₃
Chrysene	12.8 µg/L
Fluoranthene	10.6 µg/L

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the surface water quality standards (Chapter 173-201A WAC), ground water standards (Chapter 173-200 WAC), sediment quality standards (Chapter 173-204 WAC), or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances, the permit does not authorize discharge of the nonreported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from Olympus Terrace Sewer District Wastewater Treatment Plant's Engineering Report approved on April 1, 1999, and prepared by KCM, Inc. are as follows:

Table 2: Design Standards for Olympus Terrace Sewer District WWTP.

Parameter	Design Quantity
Monthly average flow (max. month)	2.61 MGD
BOD ₅ influent loading	4491 lbs./day

The design flow was changed from 2.28 mgd to 2.61 mgd. This was due to the following:

- The return of an existing unused oxidation ditch to service.
- The upgrade of the RAS pumps to provide for a firm return rate of 100 percent at a maximum month flow.
- The upgrade of the disinfection system to meet future NPDES permit requirements.
- The upgrade of the aerobic digester system to be in compliance with Federal 503 regulations for Class B sludge using on-site treatment.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS are taken from Chapter 173-221 WAC:

Table 3: Technology-based Limits.

Parameter	Limit
pH	Shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
CBOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 25 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 40 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings for CBOD (lbs./day) were calculated as the maximum monthly design flow (2.61 MGD) x concentration limit (25 mg/L) x 8.34 (conversion factor) = mass limit 544 lbs./day.

The weekly average effluent mass loading for CBOD₅ was calculated as the maximum monthly design flow (2.61 MGD) x concentration limit (40 mg/L) x 8.34 (conversion factor) = mass limit 871 lbs./day.

Monthly effluent mass loadings for TSS (lbs./day) were calculated as the maximum monthly influent design flow (2.61 MGD) x concentration limit (30 mg/L) x 8.34 (concentration) = mass limit 653 lbs./day.

The weekly average effluent mass loading for TSS was calculated as the maximum monthly design flow (2.61 MGD) x concentration (45 mg/L) x 8.34 (conversion factor) = mass limit 980 lbs./day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State surface water quality standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's water quality standards for surface waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDEGRADATION

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the state Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

MIXING ZONES

The water quality standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Possession Sound, which is designated as a Class AA receiving water in the vicinity of the outfall. Other nearby point source outfalls include the Alderwood Water District WWTP and the City of Lynnwood WWTP outfall. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA, 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	7 mg/L minimum
Temperature	13 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of UM3 Model. The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	25	95
Human Health, Carcinogen		95
Human Health, Non-carcinogen		118

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the discharge location is as follows:

For purposes of defining the critical conditions at the site, the actual density profile measured during the Outfall Dilution Study I, February 1992, was utilized. Possession Sound in the vicinity of the outfall is well mixed and seasonal density stratification should only have a very nominal effect on the dilutions. Density profiles are as appear in Appendix C.

BOD₅--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the water quality standards for surface waters.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 95:1.

Under critical conditions, there is no predicted violation of the water quality standards for surface waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the water quality standards for surface waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, copper, chromium, and zinc. A reasonable potential analysis (see Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

WHOLE EFFLUENT TOXICITY

The water quality standards for surface waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, which is referenced in the permit. Any

Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center (360-407-7472) for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water acute toxicity, and the Permittee will not be given an acute WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

The chronic toxicity limit is set relative to the mixing zone established in accordance with WAC 173-201A-100. The chronic critical effluent concentration (CCEC) is the concentration of effluent existing at the boundary of the mixing zone during critical conditions.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. The discharge will be reevaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the sediment management standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated ground water quality standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED 10-9-98

	Existing Limits Outfall # 001		Proposed Limits Outfall # 001	
To Parameter	Average Monthly	Average Weekly	Average Monthly	Average Weekly
Flow	2.275 MGD		2.61 MGD	
Carbonaceous Biochemical Oxygen Demand (5-day)	25 mg/L (474 lbs/day)	40 mg/L (759 lbs/day)	25 mg/L (544 lbs/day)	40 mg/L (871 lbs/day)
Total Suspended Solids	30 mg/l (540 lbs/day)	45 mg/l (854 lbs/day)	30 mg/L (653 lbs/day)	45 mg/l (980 lbs/day)
Fecal Coliform Bacteria	200/100 mL	400/100 mL	200/100 mL	400/100 mL
pH	Shall not be outside the range 6.0 to 9.0		Shall not be outside the range 6.0 to 9.0	

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for an oxidation ditch.

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Snohomish County Health Department.

PRETREATMENT

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly

Owned Treatment Works [POTWs]). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, Part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program [40 CFR 403.8(f)(1)(iii)], the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i)].

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge [WAC 173-216-110(5)]. (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.) Industrial dischargers need to apply for a State Waste Discharge Permit sixty (60) days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with state water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities [40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.].

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires nondelegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be

diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State Waste Discharge Permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State Waste Discharge Permit application.

Annual Submittal of List of Industrial Users

This provision requires the POTW to submit annually a list of existing and proposed SIUs and PSIUs. This requirement is intended to update the Department on an annual basis of the status of industrial users in the POTW's service area, without requiring the POTW to go through the process of performing a formal Industrial User Survey. This provision is normally applied to POTWs not serving industrial or commercial users. Although this permit does not require performance of an Industrial User Survey, the Permittee is nevertheless required under the previous section, to take adequate continuous routine measures to identify existing and new industrial discharges.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass-through or interference. The definitions of pass-through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum-based oils, or which results in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular, assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, or ground water standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.
1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.
1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.
1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations (<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on September 3, 2002, and September 10, 2002, in the *Everett Herald* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on September 28, 2004, in the *Everett Herald* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below.

Written comments were mailed to:

Water Quality Permit Coordinator
WA State Department of Ecology
Northwest Regional Office
3190 160th Avenue S.E.
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of Public Notice of Draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7000, or by writing to the address listed above.

This permit and fact sheet were written by **Bernard Jones, PE Water Quality Engineer.**

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART--An acronym for "all known, available, and reasonable methods of prevention, control, and treatment."

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation--The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation--The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities; prohibitions of practices; maintenance procedures; and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD₅--The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD₅ is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity--Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring--Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction, e.g. a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial User--A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference--A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA], sludge regulations appearing in 40 CFR Part 507; the Clean Air Act; the Toxic Substances Control Act; and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of >80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of <80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/state permits issued under both state and federal laws.

Pass-through--A discharge which exits the POTW into waters of the state in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of state water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5% of treatment plant design capacity criteria and discharges <25,000 gallons per day; or
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass-through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)--A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of nondelegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at (<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

WATER QUALITY CRITERIA (in µg/L unless otherwise noted)								
Pollutant, CAS No. & App. Ref. No.	Priority Pollutant?	Carcinogen	WQ Criteria Marine		Human Health Criteria Marine	Source and Comments	Marine	
			Acute	Chronic			Acute	Chronic
AMMONIA, unionized	N	N	233.	35		WAC 173-201A		
COPPER, 744058 6M	Y	N	4.80	3.10		WAC 173-201A	0.83	0.83
LEAD, 7439921 7M	Y	N	210.00	8.10		WAC 173-201A	0.951	0.95
MERCURY, 7439976 8M	Y	N	1.80	0.025 TR	0.15	WAC 173-201A, NTR – HH	0.85	
ZINC, 7440666 13M	Y	N	90.00	81.00		WAC 173-201A	0.946	0.946
CYANIDE, 57125 14M	Y	N	9.10	2.80	220,000	WAC 173-201A, NTR		

NPDES Permit No.

10/2/2003 4:51 PM
Copy of Copy of tsdcalc111.xls

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)																	
CALCULATIONS																	
Parameter	Metal Criteria Translator as decimal		Metal Criteria as decimal	Ambient Concentration (ug/L as dissolved)	State Water Quality Standard		Max concentration at edge of...	LIMIT REQ'D?	Effluent percentile value	Ph	Max effluent measured conc. (metals as total recoverable) ug/L	Coeff Variation CV	# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	COMMENTS
	Acute	Chronic		ug/L	Acute ug/L	Chronic ug/L	ug/L										
Ammonia				#####	5840.0000	27.61	7.27	NO	0.95	0.950	692.00	0.60	59	1.00	25	95	
copper	0.83	0.83		4.80	3.10	0.77	0.20	NO	0.95	0.368	7.74	0.60	3	3.00	25	95	
Chromium	0.993	0.993		1100	50	0.20	0.05	NO	0.95	0.368	1.66	0.60	3	3.00	25	95	
Zinc	0.946	0.946		90.0000	81.0000	14.76	3.88	NO	0.95	0.368	130.00	0.60	3	3.00	25	95	

JUN 29, 1998, 13:49:49 WED PROGRAM PLUMES, ED 3.1, 8/7/95 CASE: 2 OF 12

Title Q=2.0 MGD FEB SALINITY PROFILE (50%TILE CURRENT) nonlinear

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far dis
0.08763	1	0.08763	1000	0.0	12	7.620	76.20
port dep	port dia	plume dia	total vel	horiz vel	vertl vel	asp coeff	print frq
15.24	0.6096	0.4761	0.4922	0.4922	0.000	0.10	100
port elev	ver angle	cont coef	effl den	poll conc	decay	Froude #	Roberts F
0.3048	0.0	0.61	-0.437779	100	0	1.498	50.33
hor angle	red space	p amb den	p current	far dif	far vel	K:vel/cur	Stratif #
90	1000.0	22.6717	0.1000	0.0003	0.10	4.922	0.004053
depth	current	density	salinity	temp	amb conc	N (freq)	red grav.
0.0	0.1	19.6734	25.4	8.86	0	0.04343	0.2267
1	0.1	19.6734	25.4	8.86	0	buoy flux	puff-ther
2	0.1	20.0641	25.9	8.85	00.0000	1987	0.9783
3	0.1	22.0333	28.4	8.70	0	jet-plume	jet-cross
05.0	0.1	22.0390	28.4	8.66	0	0.6714	2.077
7	0.1	22.2787	28.7	8.62	0	plu-cross	jet-strat
9	0.1	22.4376	28.9	8.60	0	19.87	2.187
11	0.1	22.5965	29.1	8.58	0	plu-strat	
13	0.1	22.6717	29.2	8.60	0	3.946	
16	0.1	22.6717	29.2	8.60	0	hor dis>=	

CORMIX1 flow category algorithm is turned off.

15.24 m, 50.00 ft, 600.0 in.

0 to 200 m range

Help: F1. Quit: <esc>. Configuration:ATNO0. FILE: OTSD.VAR;

UM INITIAL DILUTION CALCULATION (nonlinear mode)

plume dep	plume dia	poll conc	dilution	hor dis
m	m			m
15.24	0.4761	100.0	1.000	0.000
14.76	0.7273	50.00	1.977	0.9768
13.70	1.067	25.00	3.932	1.757
12.18	1.617	12.50	7.841	2.568
10.10	2.490	6.250	15.66	3.590
7.352	3.918	3.125	31.30	5.031
4.223	6.497	1.563	62.60	7.152
2.919	8.015	1.168	83.75	8.377 -> trap level
2.890	8.059	1.160	84.33	8.407 -> surface hit

FARFIELD CALCULATION (based on Brooks, 1960, see guide)

Farfield dispersion based on wastefield width of 8.059m

--4/3 Power Law--

--Const Eddy Diff--

conc	dilution	width	conc	dilution	width	distance	time
		m			m	m	sec hrs
1.16	84.4	8.56	1.16	84.4	8.54	15.2	68.3 0.019
1.16	84.4	9.12	1.16	84.4	9.04	22.9	145 0.040
1.15	85.2	9.70	1.15	84.8	9.52	30.5	221 0.061
1.13	86.9	10.3	1.14	85.8	9.97	38.1	297 0.082
1.10	89.4	10.9	1.12	87.3	10.4	45.7	373 0.10
1.06	92.6	11.5	1.10	89.1	10.8	53.3	449 0.12
1.02	96.3	12.1	1.08	91.1	11.2	61.0	526 0.15
0.979	100	12.8	1.05	93.2	11.6	68.6	602 0.17
0.940	105	13.4	1.03	95.4	12.0	76.2	678 0.19

OLYMPUS TERRACE SEWER DISTRICT

Jul 10, 1998, 15:16:19 ERL-N PROGRAM PLUMES, Ed 3, 3/11/94 Case: 3 of 13
 Title Q=6.0 MGD FEB SALINITY PROFILE (10 PERCENTILE) nonlinear
 tot flow # ports port flow spacing effl sal effl temp far inc far dis
 0.2629 1 0.2629 1000 0.0 12 7.620 76.20
 port dep port dia plume dia total vel horiz vel vertl vel asp coeff print frq
 15.24 0.6096 0.4761 1.477 1.477 0.000 0.10 50
 port elev ver angle cont coef effl den poll conc decay Froude # Roberts F
 0.3048 0.0 0.61 -0.437779 100 0 4.494 0.1342
 hor angle red space p amb den p current far dif far vel K:vel/cur Stratif #
 90 1000.0 22.6717 0.02000 0.0003 0.02 73.83 0.004053
 depth current density salinity temp amb conc N (freq) red grav.
 0.0 0.02 19.6734 25.4 8.86 0 0.04343 0.2267
 1 0.02 19.6734 25.4 8.86 0 buoy flux puff-ther
 2 0.02 20.0641 25.9 8.85 00.00005961 5.019
 3 0.02 22.0333 28.4 8.70 0 jet-plume jet-cross
 05.0 0.02 22.0390 28.4 8.66 0 2.014 31.15
 7 0.02 22.2787 28.7 8.62 0 plu-cross jet-strat
 9 0.02 22.4376 28.9 8.60 0 7451 3.787
 11 0.02 22.5965 29.1 8.58 0 plu-strat
 13 0.02 22.6717 29.2 8.60 0 5.193
 16 0.02 22.6717 29.2 8.60 0 hor dis>=

CORMIX1 flow category algorithm is turned off.

Help: F1. Quit: <esc>. Configuration: ATNO3. FILE: OTSD.VAR;

UM INITIAL DILUTION CALCULATION (nonlinear mode)

plume dep	plume dia	poll conc	dilution	hor dis	
m	m			m	
15.24	0.4761	100.0	1.000	0.000	
15.23	0.6312	74.74	1.330	0.3919	-> bottom hit
15.23	0.6664	70.71	1.405	0.4803	-> bottom hit
15.15	0.9304	50.00	1.977	1.153	-> bottom hit
14.89	1.272	35.36	2.787	2.062	
14.27	1.655	25.00	3.932	3.174	
13.12	2.049	17.68	5.551	4.336	
11.45	2.489	12.50	7.841	5.426	
9.253	3.035	8.839	11.08	6.437	
6.459	3.749	6.250	15.66	7.412	
2.915	4.723	4.420	22.14	8.421	
2.512	4.861	4.269	22.92	8.527	-> trap level
0.9782	6.156	3.768	25.97	8.987	-> surface hit

FARFIELD CALCULATION (based on Brooks, 1960, see guide)

Farfield dispersion based on wastefield width of 6.156m

--4/3 Power Law-- -Const Eddy Diff-

conc	dilution	conc	dilution	distance	Time	
				m	sec	hrs
3.556	27.6	3.641	26.9	15.24	312.7	0.1
2.811	35.0	3.193	30.8	22.86	693.7	0.2
2.222	44.4	2.827	34.8	30.48	1075	0.3
1.803	54.9	2.554	38.6	38.10	1456	0.4
1.499	66.2	2.345	42.1	45.72	1837	0.5
1.271	78.1	2.179	45.3	53.34	2218	0.6
1.095	90.8	2.043	48.4	60.96	2599	0.7
0.9559	104.1	1.930	51.2	68.58	2980	0.8
0.8441	117.9	1.834	54.0	76.20	3361	0.9

OLYMPUS TERRACE SEWER DISTRICT

Jul 8, 1998, 16:10:58 ERL-N PROGRAM PLUMES, Ed 3, 3/11/94 Case: 4 of 12

Title Q=4.8 MGD FEB SALINITY PROFILE nonlinear

tot flow	# ports	port flow	spacing	effl sal	effl temp	far inc	far dis
0.2103	1	0.2103	1000	0.0	12	7.620	76.20
port dep	port dia	plume dia	total vel	horiz vel	vertl vel	asp coeff	print frq
15.24	0.6096	0.4761	1.181	1.181	0.000	0.10	40
port elev	ver angle	cont coef	effl den	poll conc	decay	Froude #	Roberts F
0.3048	0.0	0.61	-0.437779	100	0	3.595	167.8
hor angle	red space	p amb den	p current	far dif	far vel	K:vel/cur	Stratif #
90	1000.0	22.6717	0.2000	0.0003	0.2	5.906	0.004053
depth	current	density	salinity	temp	amb conc	N (freq)	red grav.
0.0	0.2	19.6734	25.4	8.86	0	0.04343	0.2267
1	0.2	19.6734	25.4	8.86	0	buoy flux	puff-ther
2	0.2	20.0641	25.9	8.85	00.00004768		1.863
3	0.2	22.0333	28.4	8.70	0	jet-plume	jet-cross
05.0	0.2	22.0390	28.4	8.66	0	1.611	2.492
7	0.2	22.2787	28.7	8.62	0	plu-cross	jet-strat
9	0.2	22.4376	28.9	8.60	0	5.960	3.387
11	0.2	22.5965	29.1	8.58	0	plu-strat	
13	0.2	22.6717	29.2	8.60	0	4.911	
16	0.2	22.6717	29.2	8.60	0	hor dis>=	

CORMIX1 flow category algorithm is turned off.

Help: F1. Quit: <esc>. Configuration: ATNO3. FILE: OTSD.VAR;

UM INITIAL DILUTION CALCULATION (nonlinear mode)

plume dep	plume dia	poll conc	dilution	hor dis
m	m			m
15.24	0.4761	100.0	1.000	0.000
15.23	0.6079	75.79	1.312	0.3766
15.21	0.6655	68.30	1.453	0.5446 -> bottom hit
15.17	0.7709	57.44	1.724	0.8641 -> bottom hit
15.03	0.9625	43.53	2.268	1.494
14.77	1.180	32.99	2.985	2.210
14.40	1.428	25.00	3.932	2.928
13.94	1.716	18.95	5.181	3.638
13.41	2.052	14.36	6.829	4.354
12.80	2.449	10.88	9.004	5.097
12.12	2.917	8.247	11.87	5.885
11.37	3.471	6.250	15.66	6.740
10.55	4.125	4.737	20.66	7.686
9.666	4.900	3.590	27.25	8.746
8.719	5.819	2.721	35.95	9.953
7.719	6.905	2.062	47.43	11.35
6.676	8.186	1.563	62.59	13.01
5.653	9.670	1.192	82.01	14.94 -> trap level
5.627	9.711	1.184	82.58	14.99
4.981	10.80	0.9958	98.21	16.50 -> surface hit

FARFIELD CALCULATION (based on Brooks, 1960, see guide)

Farfield dispersion based on wastefield width of 10.80m

--4/3 Power Law--		-Const Eddy Diff-		distance	Time	
conc	dilution	conc	dilution		sec	hrs
0.9942	98.4	0.9941	98.4	22.86	31.80	0.0
0.9949	98.3	0.9949	98.3	30.48	69.90	0.0
0.9953	98.3	0.9952	98.3	38.10	108.0	0.0
0.9952	98.3	0.9953	98.3	45.72	146.1	0.0
0.9942	98.4	0.9948	98.3	53.34	184.2	0.1
0.9917	98.6	0.9933	98.5	60.96	222.3	0.1
0.9873	99.1	0.9907	98.7	68.58	260.4	0.1

```

Jul  8, 1998, 15:33:56  ERL-N PROGRAM PLUMES, Ed 3, 3/11/94  Case:   6 of 12
Title  OTSD Q=1.6MGD FEBRUARY PROFILE                               nonlinear
tot flow  # ports port flow  spacing  effl sal  effl temp  far inc  far dis
0.07010      1    0.07010    1000      0.0      14      7.620    76.20
port dep  port dia plume dia total vel horiz vel vertl vel asp coeff print frq
15.24      0.6096    0.4761    0.3937    0.3937    0.000    0.10      20
port elev ver angle cont coef  effl den poll conc  decay  Froude # Roberts F
0.3048      0.0      0.61 -0.691311      100      0      1.192    62.22
hor angle red space p amb den p current  far dif  far vel K:vel/cur Stratif #
90      1000.0    22.6717    0.1000    0.0003    0.10      3.937    0.004009
depth  current  density  salinity  temp  amb conc  N (freq) red grav.
0.0      0.1    19.6734    25.4      8.86      0    0.04343    0.2293
1      0.1    19.6734    25.4      8.86      0 buoy flux puff-ther
2      0.1    20.0641    25.9      8.85      00.00001607    0.7797
3      0.1    22.0333    28.4      8.70      0 jet-plume jet-cross
05.0      0.1    22.0390    28.4      8.66      0    0.5341    1.661
7      0.1    22.2787    28.7      8.62      0 plu-cross jet-strat
9      0.1    22.4376    28.9      8.60      0    16.07    1.956
11      0.1    22.5965    29.1      8.58      0 plu-strat
13      0.1    22.6717    29.2      8.60      0    3.742
16      0.1    22.6717    29.2      8.60      0 hor dis>=

```

CORMIX1 flow category algorithm is turned off.

15.24 m, 50.00 ft, 600.0 in. 0 to 200 m range

Help: Fl. Quit: <esc>. Configuration:ATNO3. FILE: OTSD.VAR;

UM INITIAL DILUTION CALCULATION (nonlinear mode)

plume dep	plume dia	poll conc	dilution	hor dis
m	m			m
15.24	0.4761	100.0	1.000	0.000
15.21	0.5250	87.06	1.145	0.1942
15.12	0.5575	75.79	1.312	0.4000
14.99	0.5885	65.98	1.504	0.5695
14.85	0.6251	57.44	1.724	0.7145
14.70	0.6679	50.00	1.977	0.8461
14.53	0.7169	43.53	2.268	0.9704
14.35	0.7722	37.89	2.601	1.091
14.16	0.8339	32.99	2.985	1.210
13.95	0.9023	28.72	3.425	1.330
13.73	0.9779	25.00	3.931	1.451
13.50	1.061	21.76	4.512	1.575
13.24	1.152	18.95	5.180	1.703
12.97	1.253	16.49	5.947	1.837
12.69	1.363	14.36	6.828	1.976
12.38	1.483	12.50	7.840	2.123
12.05	1.615	10.88	9.002	2.278
11.71	1.759	9.473	10.34	2.443
11.34	1.918	8.247	11.87	2.619
10.95	2.091	7.180	13.63	2.807
10.53	2.281	6.250	15.66	3.009
10.10	2.490	5.441	17.98	3.227
9.634	2.721	4.737	20.65	3.462
9.150	2.977	4.124	23.72	3.716
8.642	3.259	3.590	27.25	3.991
8.113	3.572	3.125	31.29	4.290
7.564	3.921	2.721	35.95	4.615
6.999	4.310	2.368	41.29	4.969
6.424	4.749	2.062	47.43	5.351

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5.854	5.252	1.795	54.48	5.761
5.301	5.828	1.563	62.58	6.197
4.780	6.482	1.360	71.88	6.657
4.274	7.190	1.184	82.57	7.163
3.771	7.942	1.031	94.85	7.735
3.391	8.534	0.9291	105.2	8.217 -> surface hit

FARFIELD CALCULATION (based on Brooks, 1960, see guide)

Farfield dispersion based on wastefield width of 8.534m

--4/3 Power Law--		-Const Eddy Diff-		distance m	Time	
conc	dilution	conc	dilution		sec	hrs
0.9284	105.3	0.9284	105.3	15.24	70.23	0.0
0.9281	105.4	0.9284	105.3	22.86	146.4	0.0
0.9212	106.2	0.9244	105.8	30.48	222.6	0.1
0.9050	108.1	0.9146	106.9	38.10	298.8	0.1
0.8815	111.0	0.9007	108.6	45.72	375.0	0.1
0.8537	114.7	0.8839	110.7	53.34	451.2	0.1
0.8236	119.0	0.8660	113.1	60.96	527.4	0.1
0.7929	123.7	0.8476	115.6	68.58	603.6	0.2
0.7624	128.8	0.8292	118.2	76.20	679.8	0.2

APPENDIX D--RESPONSE TO COMMENTS